

REMARKS

The present invention is a device for emitting waves in an underground formation and a method of generating in an underground formation vibrational signals according to an oriented mission pattern. A device for emitting waves in an underground formation comprises at least one vibrator V including two plates 2, 3, at least one motive of element (which may be a piezoelectric or magnetostrictive material) suited to generate vibrations and to communicate the vibrations to the plates, and a generator 6 for applying periodic control signals to the at least mode of element, where the at least one vibrator is positioned in a well W or cavity and embedded in at least one solid material providing coupling thereof with the underground formation, the at least one material being in contact with the two plates over at least part of each of the respective faces thereof. The size of the plates is chosen to correspond substantially to the diameter of the cavity or well W so as to provide a maximum coupling surface. See paragraph [0039] of the Substitute Specification.

Claims 23-44 stand rejected under 35 U.S.C. §112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The specification and claims have been amended to consistently refer to plates instead of slabs. However, the Examiner should note that the Abstract continues to describe the plates 2, 3 both as end plates or slabs. The claims have been amended to overcome the stated grounds of indefiniteness.

Claims 23-25, 29, 31 and 39 stand rejected under 35 U.S.C. §102 as being anticipated by United States Patent 4,805,725 (Paulsson). The Examiner reasons as follows:

Paulsson discloses a device intended to emit wave in an underground formation comprising: a vibrating element (figure 4); two driving slabs (66 and 83); a motive element (67 and 68) to generate vibration in the slabs; a generator (58 and 56) for providing periodic control signals to the motive element; the driving slabs being coupled to the solid material that makes up the wall of the well bore.

These grounds of rejection are traversed for the following reasons.

The Examiner has interpreted elements 66 and 83 of Fig. 4 of Paulsson as being the previously recited slabs which are currently recited in the claims as amended as plates. This construction is erroneous.

Paulsson provides four clamping plates 66a-66d, as shown in Fig. 5, clamped at the body of source 60 to the well bore 500. Pistons 64a-h are pulsated radially by hydraulic fluid provided by hydraulic pump 68 to produce seismic waves as described in column 6, lines 62-67, through column 7, lines 1-16. Contact wedges 83a and 83b are activated by a driving wedge 81 downward to provide a secure clamping action to secure the source 60 within the well bore. See column 7, lines 63-68, through column 8, lines 1-19.

It is therefore seen that the Examiner's construction of the contact wedges 83a and 83b as slab, as currently claimed as a plate, is incorrect since their only function is to provide securement of the source 60 within the well bore.

Moreover, claim 23 recites where the at least one vibrator is positioned in a well or cavity and embedded in at least one solid material providing coupling thereof with the underground formation, the at least one material

being in contact with the two plates over at least part of the respective faces thereof.

There is no counterpart in Paulsson of "at least one vibrator including two plates where the at least one vibrator is positioned in a well or cavity and is embedded in at least one solid material providing coupling thereof with the underground formation, the at least one material being in contact with the two plates over at least part of each the respective faces thereof. As pointed out above, Paulsson's wedges 83 are not part of a vibrator and merely provide a clamping function to provide securement of the device 60 in the well bore. Moreover, the clamping plates 66a-66d which are pulsed by pistons 64a-h to provide seismic waves. There is no counterpart of the solid material providing coupling thereof with the underground formation which is in contact with the two plates over at least part of the respective faces thereof. Moreover, even if the clamps 66 and wedges 83 are plates, which is traversed for the reasons set forth above, neither structure is "embedded in at least one solid material providing coupling thereof with the underground formation, the at least one material being in contact with the two end plates of at least each of the faces thereof." Dependent claims 24-25, 29, 31 and 39 are not anticipated for the reasons set forth above with respect to claim 23.

Claims 26, 27 and 33-35 and 40-44 stand rejected under 35 U.S.C. §103 as being unpatentable over Paulsson. The Examiner reasons that "[t]he the difference between claim 40 and Paulsson is sequentially controlling the various vibrators by means of a control with time lags between respective triggering times that depend on intervals between locations of the

vibrators and a velocity of propagation of waves in formations surrounding the well so as to contain directive emissions". This ground of rejection is traversed for the following reasons.

Claim 40 recites, in part:

installing in a well vibrators each comprising two plates, at least one motive element for generating vibrations and to communicate the vibrations to the two plates and a generator for applying periodic control signals to the motive element, each vibrator being positioned in a well or cavity and embedded in at least one solid material providing coupling thereof with the underground formation, the at least one solid material being in contact with the two plates over at least part of each of the respective faces thereof;

The differences between the above-quoted subject matter has been discussed above with respect to claim 23. There is no basis in the record why a person of ordinary skill in the art would be led to modify the teachings of Paulsson to arrive at the subject matter of the aforementioned recitation in claim 40 given the deficiencies of Paulsson discussed above.

Moreover, the recitation in claim 40 "sequentially controlling the vibrators by means of a control with time lags between respective triggering times that depend on intervals between locations of the vibrators and a velocity of propagation of waves in the formations surrounding the well, so as to obtain a directive emission" is contended by the Examiner to "read on the utilization of the Paulsson device for seismic surveying". It is noted that the Examiner has not pointed out how the Paulsson device is operated to obtain a directive emission. It is noted that the action of the pistons 64a-h is in a radial direction which it is submitted would not produce the claimed directive emission. Moreover, the Examiner has not explained where "time lags between respective triggering times that depend on intervals between locations of the vibrators and a velocity of propagation waves in the formations

surrounding the well" is taught in Paulsson. It is requested that if Examiner persists on the stated grounds of rejection, that he explain on the record where this subject matter is found.

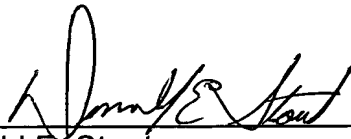
In view of the foregoing amendments and remarks, it is submitted that each of the claims in the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (612.44903X00) and please credit any excess fees to such Deposit Account.

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Respectfully submitted,

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Attachments

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